SECTION 7: COMPLEMENTARY POLICES AND REGULATIONS

RECOMMENDATION #1A: Product Standards for Irrigation Equipment – Controllers

Background

A number of studies, many of which are summarized in a 2014 Lawrence Berkeley National Laboratory (LBNL) report,[1] have shown the potential for significant water savings from landscape irrigation controllers that adjust irrigation schedules based on weather data and/or ability to shut off during rain events. The estimates contained in the LBNL report suggest savings of approximately 15%, although savings attributable to rain shut-off devices may not be representative of California conditions.

There are significant regulatory gaps that diminish the widespread installation of efficient irrigation controllers. Some existing California regulations, such as the Model Water Efficient Landscape Ordinance (MWELO) and CALGreen, now address landscape irrigation controllers. However, not all new landscape installations are covered by MWELO or CALGreen, nor do these regulations cover sales of replacement controllers for an existing landscape. Replacement controller sales are likely to make up the majority of product sales, since the lifetime of a new building (30 or more years) substantially exceeds the lifetime of a controller (approximately 10 years). Replacement controller sales are not currently regulated, and most replacement units sold in California do not contain the types of water efficiency features recommended here.

Additionally, even where controller installations are covered, MWELO and CALGreen do not contain performance standards or reference test methods.

Purpose Statement

The ITP recommends that the California Energy Commission (CEC) adopt Title 20 water and energy efficiency standards for landscape irrigation controllers. The Title 20 standards would address the regulatory gap that exists for replacement units and for units serving new landscapes not covered by MWELO. The Title 20 standards would also have the effect of addressing the current lack of performance requirements for units installed in new landscapes since Title 20 applies to all product sales in California.

The recommended standards should at least require controllers to be sold with either weather-based features or an automatic rain shut-off device. Note that this is not identical to the requirements for new landscape controllers in MWELO, which requires the new controller to be either Evapotranspiration (ET)-based or soil moisture-based, plus have a rain sensor. Thus, the proposed Title 20 standard would allow the sale of controllers with a rain shut-off system in lieu of ET-based controls, which would not meet the requirements of MWELO, but would offer a significant step up in performance over many replacement controllers sold in California today, and would apply to a much large set of controller installations. Additionally, the performance requirements and test methods in the Title 20 proposal would help ensure that *all* newly-sold products were capable of meeting the specific standard.

[1] Lawrence Berkeley National Laboratory. 2014. Williams, A., Fuchs, H., and Dunham Whitehead, C. 2014. "Estimates of Savings Achievable from Irrigation Controllers", Lawrence Berkeley National Laboratory. https://ees.lbl.gov/sites/all/files/lbnl-6604e.pdf.

For weather-based controllers, the proposed Title 20 standards would require manufacturers to meet the US Environmental Protection Agency's (EPA) WaterSense® Specification Version 1.0.[2] For controllers with rain shut-offs, manufacturers would be required to meet a performance standard based on data showing that rain shut-offs can detect at least 95% of significant precipitation events.[3] The test method would be based on an Irrigation Association method plus additional specifications to turn the testing protocol into a test method. These changes include adding a lower simulated precipitation rate that is based on California's climate, and specifications for the quality of water used to simulate rainfall events.

Additionally, CEC should be encouraged to track future development of soil moisture sensor (SMS) testing procedures. Recently, the EPA announced[4] its intention to release a draft WaterSense® test method and specification in the summer of 2016 for controllers that adjust irrigation in response to SMS data. This WaterSense® specification will be based upon a test method under development by the American Society of Agricultural and Biological Engineers. A future WaterSense® certification for SMS-based controllers could potentially plug current information gaps and serve as the basis for allowing SMS as a Title 20 compliance option in the future, if and when WaterSense® certifies these products. If the Irrigation Association, WaterSense®, and/or other organizations or agencies develop well-established testing procedures, CEC should consider updating the Title 20 standards for irrigation controllers to include an SMS compliance option in addition to, or instead of, the ET-based option, as envisioned by MWELO. Until a recognized and verifiable standard and test method is developed, stand-alone SMS-based controllers ought not be sold in California.

Further, CEC should also develop standby power consumption standards. Reports from the Natural Resources Defense Council and others show levels ranging from one to eight watts.[5] The higher end of this range is significantly higher than standby standards for many other comparable products.

Finally, CEC should be encouraged to consult with the Department of Water Resources (DWR), as well as other relevant agencies and stakeholders, regarding the proposed standards. In addition, DWR should include information on the proper installation and configuration of irrigation controllers in the MWELO training and guidance materials that would improve compliance of the Title 20 standards.

The Independent Technical Panel Recommends That:

1. CEC should adopt Title 20 standards for landscape irrigation controllers that address the following points:

    1) Landscape irrigation controllers must be shipped and sold with either a weather-based system or an automatic rain shut-off device (or both).

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[2] *WaterSense Specification for Weather-Based Irrigation Controllers*. Volume 1.0. November 3, 2011.

[3] For instance see Cardenas-Lailhacar, B., and M. Duke. 2008. "Expanding Disk Rain Sensor Performance and Potential Irrigation Water Savings." Journal of Irrigation and Drainage Engineering. February 2008. [134(1), 67-73]; and Meeks L., et al. 2012. "Long Term Expanding-Disk Rain Sensor Accuracy." Journal of Irrigation and Drainage Engineering. January 2012. [138(1), 16–20]

[4] http://www3.epa.gov/watersense/products/soil_moisture_based_technologies.html

[5] Delforge, P., Schmidt L., Schmidt, S. 2015. "Devices Wasting Huge Amounts of Electricity when Not in Active Use." Natural Resources Defense Council. Issue Paper. May 2015; [LBNL] 2009. Lawrence Berkeley National Laboratory. Brown, R. "Energy Consumption of Irrigation Controllers." Environmental Energy Technologies Division, June 1, 2009. http://www.energy.ca.gov/appliances/irrigation/documents/2009-06-01_workshop/presentations/Brown_Rich_LBNL_Irrigation_Controls.pdf

2) Weather-based controllers must meet the requirements in the EPA's WaterSense® Specification for Weather-Based Irrigation Controllers Version 1.0, including testing for irrigation adequacy and irrigation excess.

3) Automatic rain shut-off devices must be tested and certified using a proposed test method based on the Irrigation Association's Smart Water Application Technologies "Turf and Landscape Irrigation System Smart Controllers Climatologically Based Controllers: 8th Testing Protocol" (September 2008) along with additional elements specified by the Title 20 standards to address rainfall rates that are more common in California. Automatic rain shut-off devices as shipped must detect 95 percent of rainfall events of 1/4 inch or 6 millimeters.

4) The controller shall be capable of accommodating watering restrictions as follows:

   a) Operation on a prescribed day(s)-of-week schedule (e.g., Monday-Wednesday-Friday, Tuesday-Thursday-Saturday; any two days; any single day, etc.).

   b) Either even day or odd day scheduling, or any day interval scheduling between two and seven days.

   c) The ability to set irrigation runtimes to avoid watering during a prohibited time of day (e.g., between 9:00 a.m. and 9:00 p.m.).

   d) Complete shutoff (e.g., on/off switch) to accommodate outdoor irrigation prohibition restrictions.

5) The controller shall be capable of preserving the contents of the irrigation program settings when the power source is lost and without relying on an external battery backup.

6) The Title 20 standards should also include limits on standby power loss consistent with other California and European product standards.

7) CEC should consult with DWR, as well as other relevant agencies and stakeholders, regarding these proposed standards.

8) CEC should set a standard for soil moisture sensor-based controllers upon the completion and publication of an acceptable test method for such products.

2. DWR should include information on the proper installation and configuration of landscape irrigation controllers to better ensure that potential water savings from both Title 20 standards and MWELO will actually be achieved.